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ABSTRACT

This discussion of the development and use of the ARCS model, a system for improving the motivational appeal of instructional materials, instructor behavior, and course/lesson design, begins by considering the need for a such a system. Noting that research on motivation is included in several different research fields and theoretical orientations, the paper then briefly reviews some of the alternative approaches to the study of motivation and presents a theory-based synthesis that was developed as a foundation for building a motivational design model. The four motivational categories of the model--Attention, Relevance, Confidence, and Satisfaction--are then defined and discussed in the context of major conditions that must be met for people to become and remain motivated. Three steps in the use of the ARCS model as a systematic design model interfacing with typical instructional design and development models are discussed under the headings Define, Develop, and Evaluate, and guidelines for integrating motivational strategies into instruction are suggested. Descriptions of the use of the ARCS model in two teacher training workshops with rather different groups of participants and a brief statement on the status of the model conclude this paper. (22 references) (MES)

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by John M. Keller

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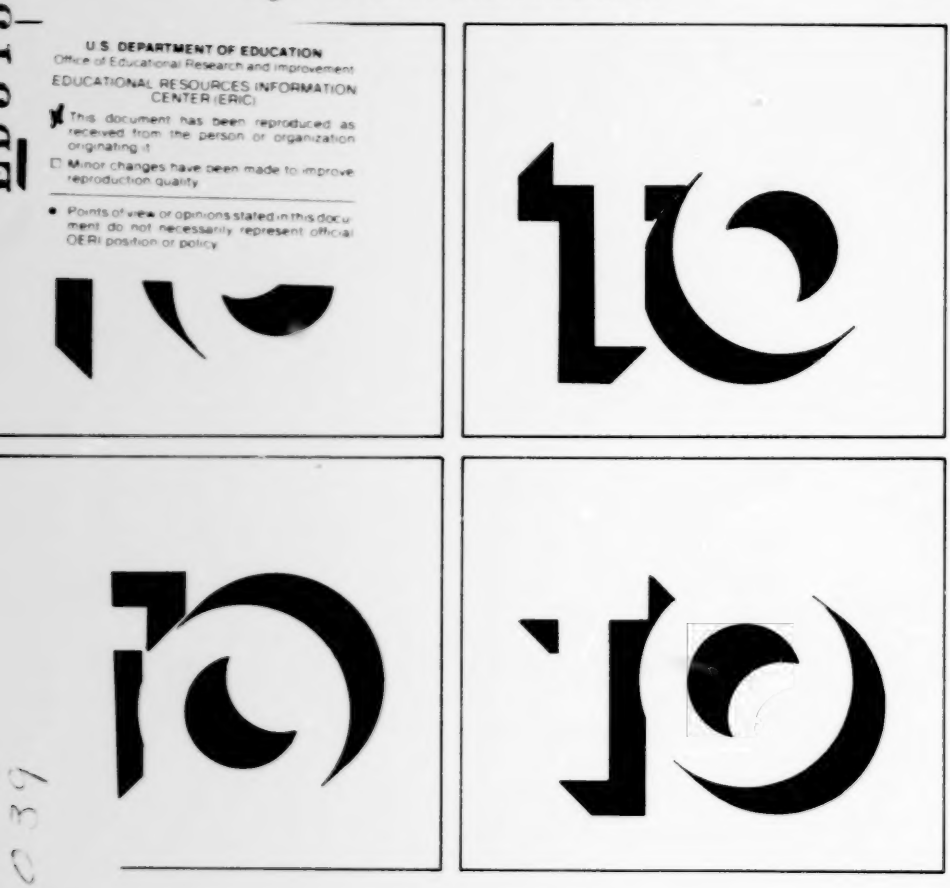

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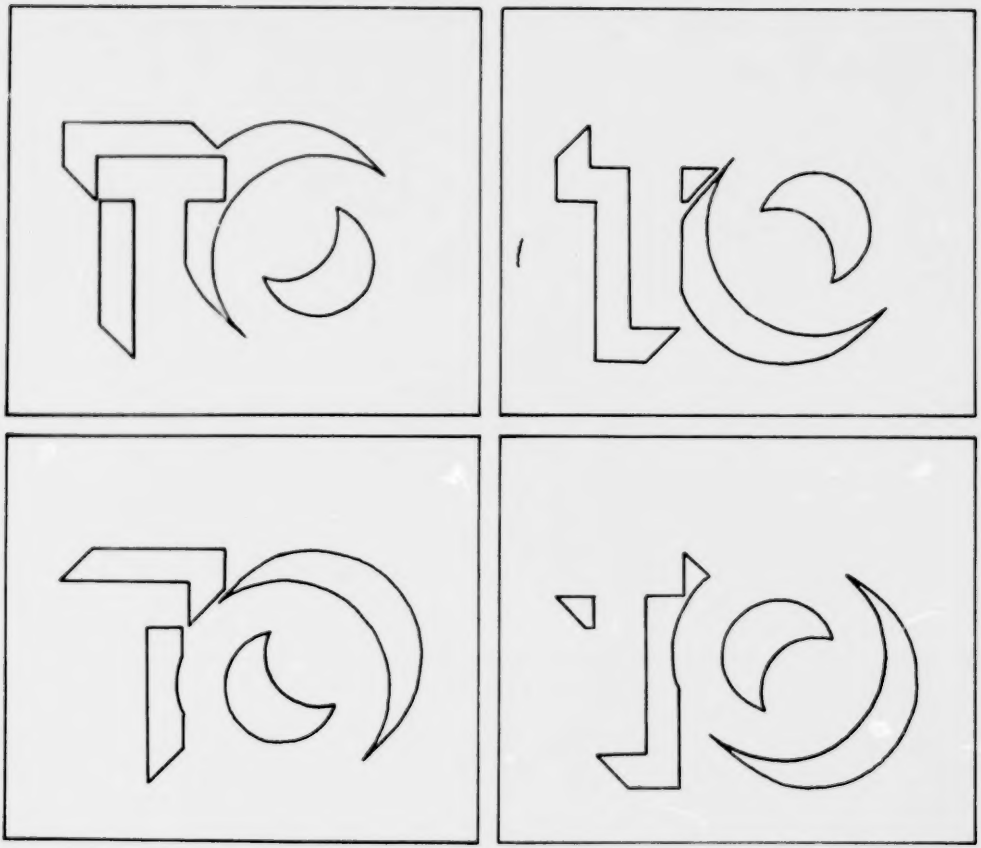

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Development and Use of the ARCS Model of Motivational Design

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WHAT IS THE ARCS MODEL?

The ARCS model is a system for improving the motivational appeal of instructional materials, of instructor behavior, and of the way in which lessons (or modules) and courses are designed. It provides strategies that a course designer or teacher can use to make instruction responsive to the interests and needs of learners.

WHY THE ARCS MODEL?

Some people are saying that motivation is becoming one the major problems in school classrooms, but others would say that motivation has been a problem for as long as we can imagine (Figure 1). In either case, it is difficult to find information that is concerned specifically with how to improve the motivational quality of instruction. Much has been written about how to design instruction that will be effective if students want to learn, but there is relatively little that

Figure 1: A topical problem

tells how to make the instruction more appealing.

Most of the material about motivation (see Figure 2) deals either with psychological approaches to changing individual behavior, or with job satisfaction and work performance in business and industry. In education, the linkage is somewhat weaker. The material on motivation is scattered throughout several different research fields, or is included under the general category of affective behavior (Keller, 1979). There are some good applications-oriented materials (e.g. Mager, 1968; Wlodkowski 1978), but they tend to be restricted to specific theoretical orientations such as behavioral modification or humanism. They do not incorporate principles from the broad range of motivational factors that have been studied in recent years (e.g. curiosity, sensation seeking, and intrinsic motivation).

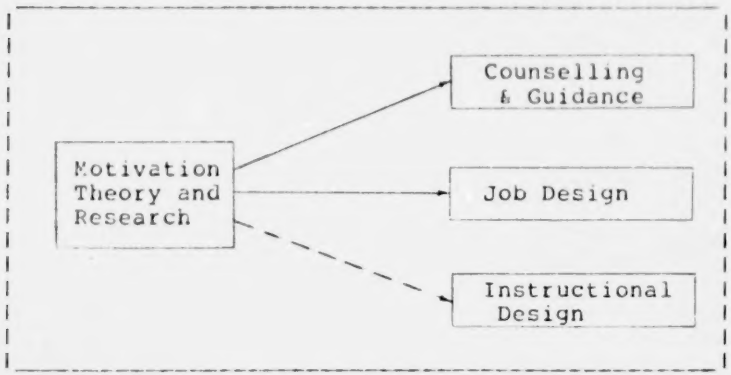

Figure 2: Influences of motivational research.

WHERE DID THE ARCS MODEL COME FROM?

There are many concepts and theories that explain various aspects of motivation. A former student of mine created a visual display that illustrates both the diversity, and the major theoretical orientations, of many of these researchers (Figure 3). It is significant that he used the metaphor of an island, for the work on motivation does tend to be isolated from the behavioral and cognitive theories that have been used in instructional design research. As we look at the map, a brief "tour" will orient us to its chief characteristics. As Dodge (1979) put it:

> To the north lies an eroding peninsula of rat studies. An almost impenetrable mountain range separates this region from the rest of the island. However, there are several neobehavioristic passes through the mountains which lead to some cognitivist highlands. These merge to the east with the plains of the personality psychologists. Southward lies the lush jungle of humanistic psychology. (p. II-4)

Given this array of alternative approaches to the study of motivation, it was necessary to chose to work within the context of a specific theory, or to try to construct a synthesis as a foundation for building a motivational design model. The latter course was chosen, and the resulting

Figure 3: Motivation Island

synthesis (Keller, 1979, 1983) is both theory-based and useful for developing a set of motivational categories and prescriptive strategies. The synthesis is grounded in expectancy-value theory (e.g Porter & Lawler, 1968) which assumes that people are motivated to engage in an activity if it is perceived to be linked to the satisfaction of personal needs (the value aspect), and if there is a positive expectancy for success (the expectancy aspect).

Expectancy-value theory is used here as a meta-theory for integrating a large number of specific motivational concepts based on similarities in their critical attributes (Figure 4). There are, of course, important differences in the specific formulations and research paradigms among these concepts, but the similarities are important to the applied problem solver. It is the similarities (Keller, 1979, 1983) that allow us to cluster the concepts into a higher order schema.

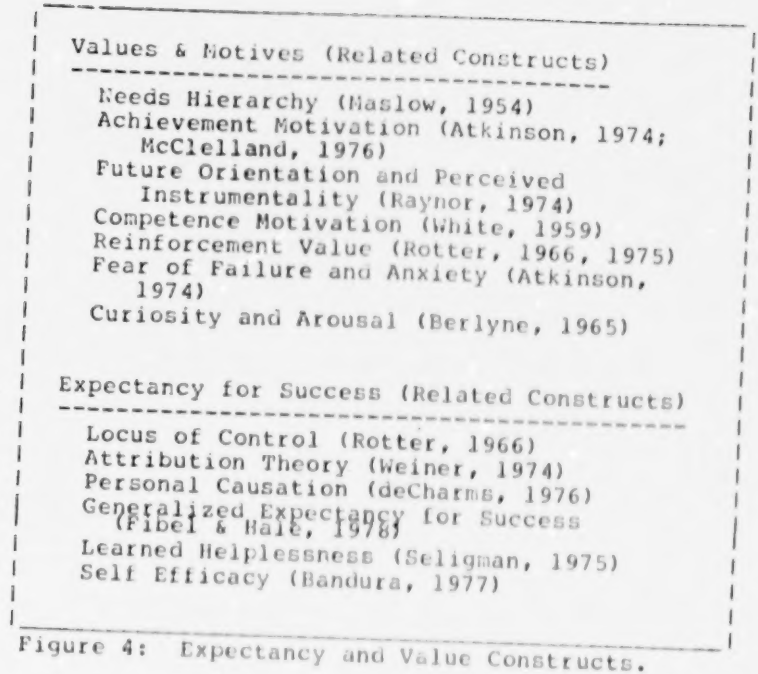
Values & Motives (Related Constructs)
Needs Hierarchy (Maslow, 1954)
Achievement Motivation (Atkinson, 1974; McClelland, 1976)
Future Orientation and Perceived Instrumentality (Raynor, 1974)
Competence Motivation (White, 1959)
Reinforcement Value (Rotter, 1966, 1975)
Fear of Failure and Anxiety (Atkinson, 1974)
Curiosity and Arousal (Berlyne, 1965)
Expectancy for Success (Related Constructs)
Locus of Control (Rotter, 1966)
Attribution Theory (Weiner, 1974)
Personal Causation (deCharms, 1976)
Generalized Expectancy for Success (Fibel & Hale, 1978)
Learned Helplessness (Seligman, 1975)
Self Efficacy (Bandura, 1977)

Figure 4: Expectancy and Value Constructs.

In the continued development of the synthesis that led to the creation of the ARCS model (Keller, 1979, 1983), these two categories were expanded into four. The category called "value" was subdivided into two categories called "interest" and "relevance," the third category stayed the same, and a fourth category called "outcomes" was added. Interest and relevance were separated in order to make a distinction between a set of variables, or constructs, that are concerned primarily with attention and arousal versus other motives such as need for achievement and perceived utility. All of these variables have an influence on what we think is important, but interest refers more to attentional factors in the environment, and relevance refers

more to goal directed activity.

The third category, expectancy, refers to our expectation for being successful. It includes several areas of research that are concerned with people's self-confidence, and their feelings of control over their lives and environment. There is no doubt (Jones, 1977) that our perception of the likelihood of being successful influences our actual degree of success.

The fourth category, outcomes, refers to the reinforcing value of obtained outcomes. It includes cognitive factors such as cognitive evaluation theory (Deci, 1975) and environmental factors as described in conditioning theory. The outcomes of goal directed behavior have an influence on subsequent levels of perceived value and expectancy for success and, therefore, form the final category of motivational variables in this model. Fuller explanations of this syntheses and its rationale are provided by Keller (1983).

The next, and final, major step in the initial design of the model was to generate a large list of motivational strategy statements, and to sort them to see whether the four categories of the model provided a valid conceptual scheme. All of the strategies used in the development of the model were derived from research findings and from practices that have resulted in motivated learners. Strategy statements were obtained from research studies in

all of the conceptual areas listed in Figure 4, from practical handbooks, and from interviews with practitioners. The strategy statements were then sorted into the four categories of the model, and were further divided into useful subcategories.

This was not a rigorously controlled process of inductive research, but there was evidence in support of the validity of the model. Four people worked on the classification process, and the correspondance of judgments for the placement of strategies into categories was very high.

Following this design process, the four categories were renamed as indicated below in order to strenthen the central feature of each, and to generate a useful acronym. The resulting catalog of strategies is used in the process of identifying and solving motivational problems in instructional materials and methods (Keller & Dodge, 1983).

CHARACTERISTICS OF THE ARCS MODEL

The ARCS Model defines four major conditions (Attention, Relevance, Confidence, and Satisfaction) that have to be met for people to become and remain motivated. Each of these conditions subsumes several areas of psychological research (Keller, 1979), and has been divided into specific subcategories with sample motivational strategy prescriptions (Keller, 1982; Keller & Dodge, 1983). Following is a brief description of each of the four major conditions.

Attention. The first condition, attention, is also a prerequisite for learning. At one level, it is fairly easy to gain attention. A dramatic statement, a sharp noise, a 'pregnant' pause, all of these and many other devices are used. However, getting attention is not enough.

The real challenge is to sustain it, to produce a satisfactory level of attention throughout the course. To do this, we have to respond to the sensation seeking needs of students (Zuckerman, 1971), and arouse their basic curiosity (Berlyne, 1965). Ultimately, the best way to fight boredom and indifference is to stimulate their curiosities so the instructor can spend more time directing attention than in getting it.

Relevance. How many times have we heard students ask, 'Why do I have to study this?' When a convincing answer is not forthcoming, there is a relevance problem. To answer this question, many course designers and instructors try to make the instruction seem relevant to present and future career opportunities for the students. Others, in a more classical tradition, believe that learning should be an end in itself, something that students come to enjoy and treasure. However, there is a third way. It focuses on process rather than ends.

Relevance can come from the way someting is taught; it does not have to come from the content itself. For example, people high in need for affiliation will tend to enjoy classes in which they can work cooperatively in groups. Similarly, people high in need for achievement enjoy the opportunity to set moderately challenging goals, and to take personal responsibility for achieving them. To the extent that a course of instruction offers opportunities for individuals to satisfy these and other needs, the person will have a feeling of perceived relevance, that this course is 'for me.'

Confidence. Losers and winners. We've all seen them both. However, we are not talking about the people who come in first or last in a competitive sport. We are talking about people who never quite make it even when the odds are in their favor, versus the ones who always pull through no matter what the odds.

This characteristic is part of our third requirement for motivation. It has several popular names including 'will-power,' 'guts,' and 'the power of positive thinking.' More formally, it is called such things as expectancy for success (Fibel & Hale, 1978), self-fulfilling prophecy (Jones, 1977), and personal causation (Bandura, 1977) to mention only a few. Essentially, it refers to a person's belief that if he tries to do something he will succeed, and its effects on performance can be dramatic.

Satisfaction. This category incorporates the things we know about ways to make people feel good about their accomplishments. According to reinforcement theory, people should be more motivated if we define the task and the reward, and we use an appropriate reinforcement schedule. Why, then, do people sometimes get resentful and even angry when we tell them what they have to do, and what we will give them as a reward? An important part of the answer seems to be 'control.'

When we require someone to do something to get a reward that we control, we may create resentment because we have taken over part of that person's ability to control his own life. This is especially likely to happen when the behavior we control is one which the other person enjoys for intrinsically satisfying reasons. The establishment of external control over an intrinsically satisfying behavior can decrease the person's enjoyment of the activity (Lepper & Greene, 1978). But, there are appropriate ways to use

extrinsic rewards in learning situations. The challenge is to provide appropriate contingencies without overcontrolling.

These four categories form the basis of the ARCS Model. Within each are subcategories that include prescriptive motivational strategies (see Keller & Dodge, 1982). However, given the purpose of this model for helping to identify specific ways to make instruction more appealing, there is still the question of procedure; how is the ARCS Model used in an instructional development sequence? The following two sections provide a brief description of this process, and the results of using the model with two groups of teachers.

USING THE ARCS MODEL

The ARCS Model is a systematic design model that interfaces with typical instructional design and development models. It can be conveniently separated into the steps of define, develop, and evaluate (Figure 5).

Define. The define phase has two purposes. The first is to determine the general level of audience motivation. In some situations, a group of students will be highly motivated for a particular class due to their intrinsic interest in the topic, or because of external factors that make the class important to them. In other cases, the students' motivation will have to be stimulated after they arrive at the class. In the first case, the designer or

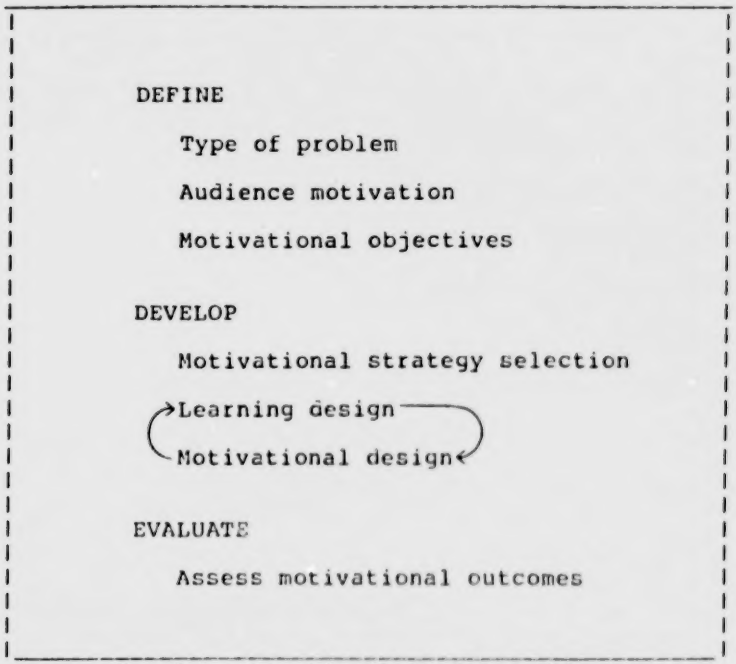

Figure 5: The motivational design model

instructor will have to maintain the motivation, but in the second case, strategies to establish motivation will be needed.

An important constraint of the ARCS Model that became more explicit during the developmental testing is that it is designed to help make a course of instruction more motivating for an ordinary class of students. This means a class in which some people will be very cooperative and interested, others will be indifferent and bored, and some may even be slightly antagonistic. However, the group as a whole will be responsive if an effective set of motivational strategies are employed. The ARCS model is not intended to

solve the problems of an individual person or group with severe personality difficulties.

The second purpose of the define phase is to determine the specific motivational problem categories (as defined in the ARCS Model), and prepare motivational objectives (Figure 5). Included in the ARCS Model materials is a checklist that helps identify the specific areas which are most likely to need special attention in the development of motivational strategies. Of course, it is always possible that a balanced focus will be needed in a given context; that is, a designer or teacher may not have an acute problem area, but simply might need to give balanced treatment to all four areas. The resulting motivational objectives will indicate the results of this definitional stage.

Development. The first step in development is to create a list of potential motivational strategies for each of the objectives. This list will almost always be longer than the final one. For any given motivational objective, there can be any number of specific strategies that will help accomplish the objective. Brainstorming is generally used at this phase. The goal is to move away from the analytical thinking that characterizes the define phase, and to begin thinking in an uncritical, more creative mode.

The next step is to produce an effective integration of the motivational strategies into the instruction. There are five guidelines that help accomplish this integration. The

motivational strategies should:

1. not take up too much time,
2. not detract from the learning objectives,
3. fall within the time and money constraints of the development and implementation aspects of the instruction,
4. be acceptable to the audience, and
5. be compatable with the delivery system, including the instructor's personal style.

The use of these guidelines requires a cyclical process (Figure 5) of putting the motivational strategies into the instructional context, determining the quality of the 'fit,' and then revising.

In this process, it is important to note that 'more is not always better.' For example, if a class comes to you already motivated, you do not want to inject an excessive number of motivational strategies. This would slow the class, and distract from their orientation to the task.

The strategies included in the model are proven, but their effectiveness, and the exact way in which they are implemented depends in part on the personality of the instructor, and the type of atmosphere that he or she desires (e.g. formal versus informal). Consequently, the final selection of strategies for a given instructional event is based, in large part, on the judgments of the designer and teacher rather than on objective criteria. In this sense, even though the ARCS Model is a prescriptive

model, it is more heuristic than algorithmic. It helps insure a solution to motivational problems, but it does not guarantee one as does a correctly applied algorithm. It requires experience and judgment, and perhaps even some trial-and-error from the designer.

Evaluation. It is important to base the evaluation of the materials on motivational as well as learning outcomes. Too often, decisions about the effectiveness of motivational strategies are based on gain scores or other achievement measures. This is not a good practice, because these dependent variables are affected by many factors, not just motivational ones (see Keller, 1979, for a more complete discussion of this point). To judge motivational consequences, we need to use direct measures of persistence, intensity of effort, emotion, and attitude.

DEVELOPMENTAL TEST OF THE ARCS MODEL

The ARCS Model has been used in two teacher training workshops. The first was in the spring of 1982 with 18 teachers of children between the ages of 12 and 14. All of the teachers were from the same school district, and most were from the same school. The workshop took place over a period of four months with afternoon meetings twice a month. It was conducted by a colleague of the author who was familiar with the motivational material surrounding the ARCS Model, and included one session in which the author presented the specific strategies and procedures of the model.

During the four months of the project, the teachers went through the complete process of defining a motivational problem, formulating objectives, selecting strategies, preparing an implementation plan, enacting the plan, conducting evaluation, analyzing results, and describing their conclusions. Most of the teachers worked on developing or revising modules of instruction to make them more interesting, but some worked on the motivational problems of specific students.

In general, the results of this experience were positive. Many teachers achieved the motivational goals that they had set. However, even those who did not tended to feel that they had benefited from the process, and they felt encouraged to try again.

An interesting consequence of using the ARCS Model in this setting occurred. Some of the teachers, in their conclusions, suggested that the key factor in the process was that they had simply paid more attention to the student, or class. At first, this seemed to be a disappointing outcome for the ARCS Model. Why have a reasonably complex, formalized model if 'paying more attention' is all that is required?

Upon reflection, it became clear that the teachers were not giving themselves enough credit for what they had actually accomplished. After looking back at their action plans and logbooks, it was obvious that they had used specific strategies to bring about the change. For them, 'attention' was simply a convenient word to summarize a great many specific acts.

In the winter of 1982-83 a second test was conducted with another group consisting of 16 teachers ranging from kindergarten to senior high school within a single school district. This was a six-day workshop conducted by the author and two assistants for two days each in November, December, and January. One day each month was spent in a working session with the teachers, and the other day each month was used for classroom visitations and individual consultation.

At the end of the first session, the teachers had defined their problems. During the next four weeks, they

were to work on collecting data to verify the problem, and to develop a preliminary strategy list. They were enthusiastic when we left, but when we returned, several had run into difficulties and become discouraged.

We had encouraged the teachers to work on instructional improvement problems, rather than behavioral modification ones, but several had chosen the latter. Upon closer inspection of the details of the problems of some of these students, it became clear that it would be a challenge even for a professional psychotherapist to help them. The teachers who chose instructional improvement projects had, as a group, made better progress and felt more positive. We asked the concerned teachers to redefine their problems into something more manageable, and their progress improved quickly. However, in general there were slightly more difficulties with the second group than the first.

Why, we wondered, did the ARCS Model work better with the first group, which included several teachers who chose behavior modification problems? In that group, the workshop leader had worked with the school district, and with the same group of teachers, on several other projects during the preceding three years. The earlier projects were concerned with helping the teachers learn to use systematic development and research procedures for creating and validating instructional improvement projects in the areas of curiosity and cognitive problem-solving skills.

In the second group, most of the teachers had not had an inservice training program in several years, and some had never had one. Consequently, these teachers were starting from 'scratch' in terms of orienting themselves toward a productive experience in the workshop, and toward the specific processes of systematic development. They had to learn the generic design process as represented in the specific context of the ARCS Model, and the content of the model itself. This group chose too many problems that, although interesting and important to them, fell outside the scope of the ARCS strategies or the time constraints of the workshop.

STATUS OF THE ARCS MODEL

The two developmental tests tended to confirm the basic assumptions of the ARCS Model. The data collected by the teachers at the end of their projects indicated that many of them accomplished the motivational goal they had set, and they felt that the ARCS Model was helpful to them. This provided support at both the objective and affective levels. Furthermore, the ARCS Model works best with instructional improvement projects as it was intended. It is not designed to help solve motivational problems of individual students, although it can be helpful to a teacher or counsellor who has experience with behavioral change strategies, and the development of individual learning packages. The ARCS Model works best as a tool to assist in improving the appeal of instructional materials and programs.

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